



Solving the DER Interoperability Challenge:

A QualityLogic Perspective



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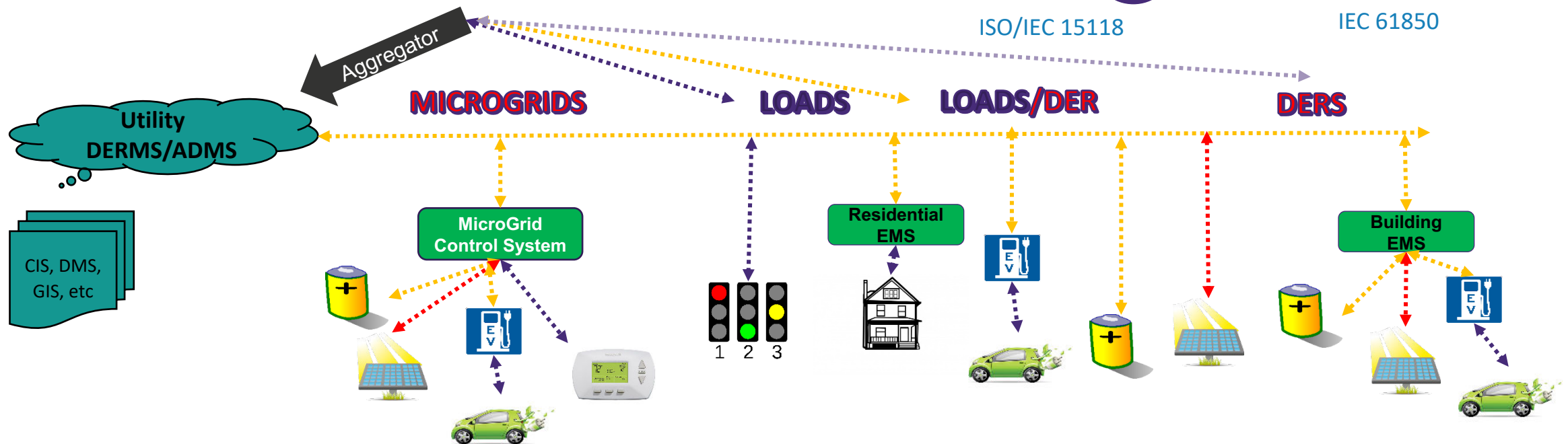
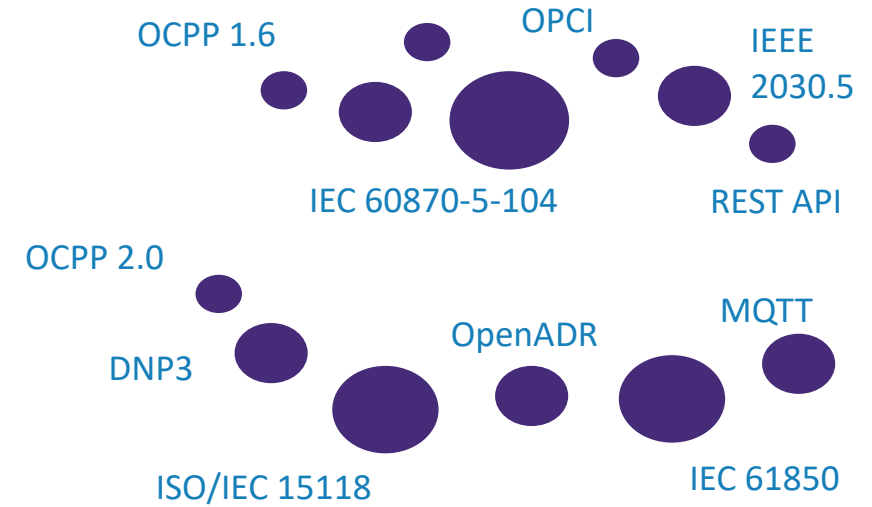
Agenda

- Challenges in DER Interoperability
 - Understanding and selecting Protocols
 - Accelerating Adoption of Standard Protocols
 - Interoperability using Standard Protocols
 - Making sure products work and Interoperate
- QL Observations and Solutions
 - Education and information
 - Enabling and Supporting Adoption
 - Accelerating Interoperability
 - Accelerating Product Quality
- Summary



Challenge 1: Which Protocol?

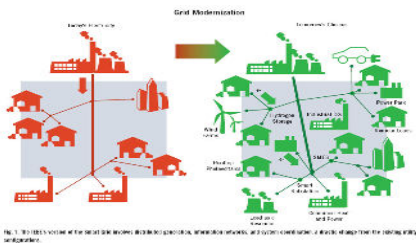
- Evolving DER complexity, quantities and use cases
- How do you choose the right communications protocol?



Challenge2: Adoption of Standards



Missing Mandates



Utility Requirements

*Our Solution is
the BEST!! It is
all you need*

Proprietary
Solutions

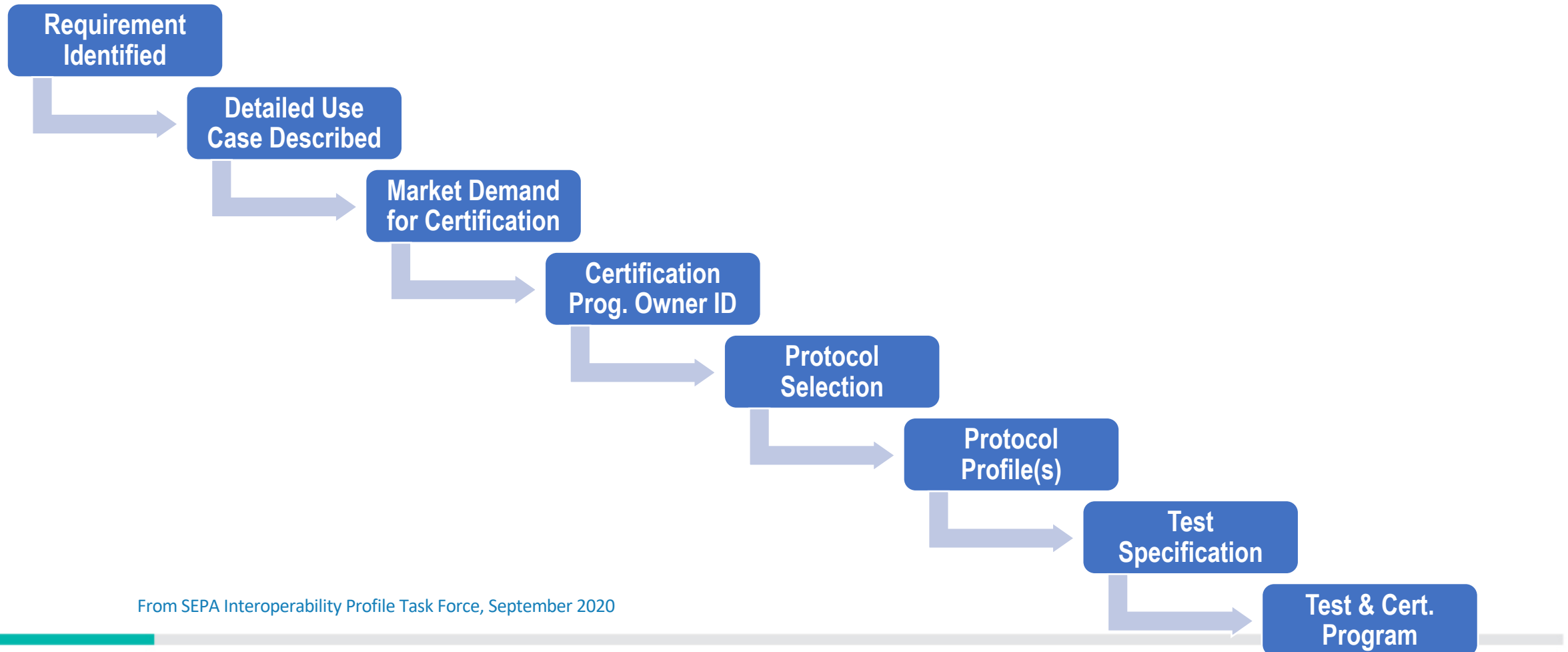
Protocol	Protocol	Protocol
OpenADR 2.0	OCHP (EV)	Open SG Protocol
IEEE 2030.5 (1547)	OCPI (EV)	TeMIX
IEC 61850-8-2	OCPP (EV)	CTA 2045
DNP3 (1547)	OICP (EV)	ETSI TS 104.001
SunSpec (1547)	OSCP (EV)	FAN USEF
MESA	Green Button	ASHRAE 201/2030.5
IEC 61850-90-8	Orange Button	PowerMatcher
ISO/IEC 15118	OpenFMB	
eMIP (EV)	IEC 61850-4-720	

Competing Standards/
Lack of Knowledge



Implementation
(In)experience

Challenge 3: Achieving Interoperability



From SEPA Interoperability Profile Task Force, September 2020

Challenge 4: Product Quality

- **Standards are great but the product still has to work – flawlessly and successfully**
- **Requires great specifications, development and testing, testing, testing**

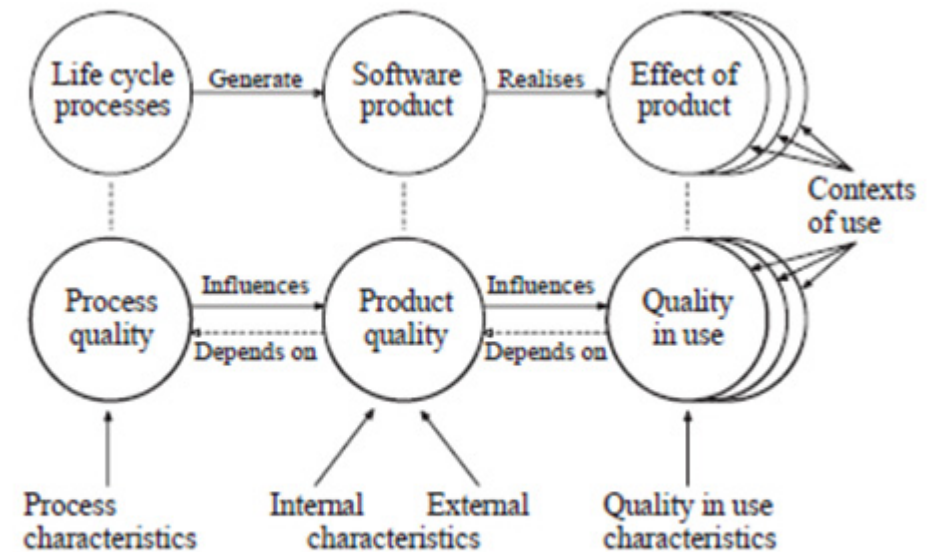
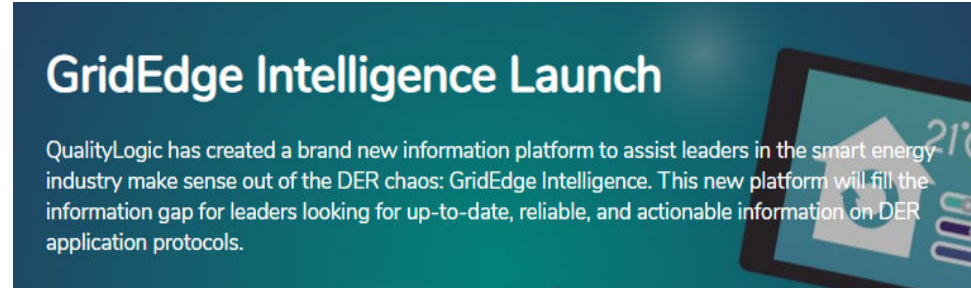


FIGURE 1 : PROCESS AND PRODUCT ORIENTED SOFTWARE QUALITY

Challenge 1: QualityLogic Protocol Selection Assistance



<https://www.gridedgeintelligence.com/>



Challenge 2: Promoting Standards



**UL 1741
UL 3001**



SAE J3072 V2G



**OpenADR 2.0a/b Profiles
Draft DER Profile
OpenADR Technical Workshop**



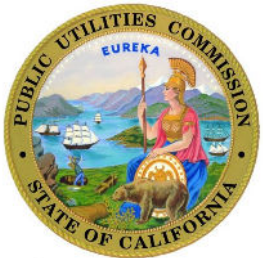
**IEEE 2030.5 WG
IEEE 1547.1
IEEE 1547.2**



**IEEE 2030.5 Open Source
CSI4 Smart Inverter Demo**



**CSIP Test Specification
Profile Working Group**



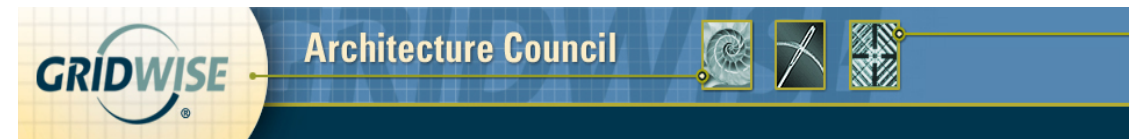
**SIWG
Microgrid Rulemaking**



**IEEE 2030.5 Open Source
CSI4 Smart Inverter Demo**



**UU102: Intro to Standard
Comm Protocols 2018**



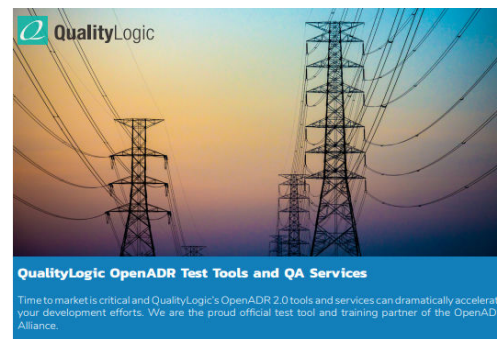
**Decision Maker's Interoperability Checklist
Decision Maker's Transactive Energy Checklist
Interoperability Maturity Model**

Challenge 3: Enabling Interoperability

- **OpenADR and IEEE 2030.5 Developer and Implementer Training – hundreds trained globally**
- **OpenADR and IEEE 2030.5 Test and Certification tools**
 - Official OpenADR Certification Test Harness
 - Approved IEEE 2030.5 Test SW Vendor for SunSpec
- **Introducing IEEE 1547.1 Interop Conformance Test Tool**
- **Advising utilities and vendors on specific application profiles to enable interoperable eco-systems**



<https://www.qualitylogic.com/what-we-test/smart-energy-standards/ieee-2030-5-test-tools-ga-services/>



<https://www.qualitylogic.com/what-we-test/smart-energy-standards/openadr-2-test-tools-and-ga-services/>

A screenshot of the QualityLogic training catalog website. It displays a grid of course cards. Each card includes the course title, duration in lessons, and price. The courses listed are: IEEE 2030.5 DER Training Plus (51 Lessons, \$1,995.00), IEEE 2030.5 DER Training (51 Lessons, \$1,495.00), Fundamentals of OpenADR Plus (30 Lessons, \$1,495.00), Fundamentals of OpenADR (30 Lessons, \$995.00), OpenADR High-Level Overview (9 Lessons, \$99.00), Webinar: Selecting the Right DER Protocol (6 Lessons, Free), and Webinar: Introduction to OpenADR (5 Lessons, Free). The cards feature images of solar panels, power lines, and a graph of system supply over time.

<https://qualitylogic.thinkific.com/>

Challenge 4: Good Stuff, On Time and Budget

- **Founded in 1986 with Labs in Boise and OK**
- **Software/firmware QA for hundreds of companies such as HP, Microsoft, Disney, Cisco, Adobe, etc**
- **Expertise in test planning, test case development, manual and automated test execution**

Industry Leading Software Testing Company

QualityLogic is a top choice for software testing services. Leading B2B ratings and reviews platform **Clutch** named QualityLogic as a top 10 software application testing provider in their annual Global Leaders List. Leaders in this category were chosen based on ability to deliver, industry expertise, and customer reviews. QualityLogic is proud to be a part of this prestigious list and is dedicated to providing excellent software testing services to our valued customers.

"QualityLogic improved our approach to QA testing, helping us rewrite hundreds of previously deficient tests as a result." – COO, Virtual Reality Startup

Contact us today

Clutch

QualityLogic

★★★★★ 13 REVIEWS

"We saw a huge decrease in complaints after we brought QualityLogic on board."

VP Engineering, BrightLine

<https://www.qualitylogic.com/>



Software Testing Services For The Smart Energy Industry

Known as a proven leader in the smart energy industry, QualityLogic also has over 30 years of experience in software/system testing and test tool development. We provide a full spectrum of software quality services solutions for many industries including media and entertainment, healthcare, smart energy, imaging, telecommunications, and more.

Our testing services focus on ensuring that your conformance, performance, usability and interoperability testing needs are met or exceeded.

We build our client project teams from our internal resource pools and hire additional resources as needed based on client requirements or internal development programs. We train new team members by using our most experienced personnel to provide rapid, hands-on infrastructure familiarity, on-the-job training and continued shepherding as they learn their project tasks and become proficient. Engagement durations have run from weeks to years with some projects continuously operating for more than seven years.

QualityLogic provides a full range of QA and testing services including:

- QA assessment
- Planning
- Test architecture & methodology

- Test case development
- Test automation
- Load testing
- [Big data testing & validation](#)
- Functional testing
- Performance & usability testing
- Compatibility
- Interoperability

We support a large inventory of connected devices and computer systems available for quick test configuration management. All QA operations are conducted on-shore in the USA.

Sampling of Software Test Services

Web Applications

Incorporating sophisticated applications and technologies into your website creates a critical requirement for a quick, efficient, cost-effective testing solution. QualityLogic combines extensive

For more information

- **Publications** - <https://www.qualitylogic.com/knowledge-center/content-library/>
- **IEEE 2030.5 Training** - <https://www.qualitylogic.com/training/ieee-2030-5-der-workshop/>
- **OpenADR Training** - <https://www.qualitylogic.com/training/openadr-training-workshop/>
- **Online Training** - <https://qualitylogic.thinkific.com/>
- **IEEE 2030.5 Tools** - <https://www.qualitylogic.com/what-we-test/smart-energy-standards/ieee-2030-5-test-tools-qa-services/>
- **OpenADR Test Tools** - <https://www.qualitylogic.com/what-we-test/smart-energy-standards/openadr-2-test-tools-and-qa-services/>
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